WE CLAIM:

1. In a computer network with a plurality of network devices, a method for distributed generation of unique random numbers for digital cookies, comprising the steps of:

generating a first portion of a x-bit digital cookie on a first network device on the computer network based on an x-bit bit mask template sent to the first network device from a second network device on the computer network;

sending a first message to request a second portion of the x-bit digital cookie from the second network device, wherein the first message includes the first portion of the x-bit digital cookie;

receiving a first response from the second network device wherein the first response includes a second portion of the x-bit digital cookie from the second network device, and wherein the second network device generates potential x-bit digital cookies using the first portion of the x-bit digital cookie from the first network device and a second portion of the x-bit digital cookie generated on the second network device until the second network device generates a potential x-bit digital cookie that is not in use on the computer network;

generating a complete x-bit digital cookie on the first network device using the first portion of the x-bit digital cookie and the second portion of the x-bit digital cookie, wherein the complete x-bit digital cookie is not in use on the computer network.

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2. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of Claim 1.

3. The method of Claim 1 further comprising:

sending the complete x-bit digital cookie in a plurality of messages used to a establish a secure connection between the first network device on the computer network and third network device on a remote computer network.

4. The method of Claim 4 wherein the plurality of messages include a plurality of Internet Key Exchange protocol messages.

5. The method of Claim 1 wherein the step of generating a first portion of an x-bit digital cookie includes generating a n-bit random number, wherein the number-n is determined by counting n-number of bits set to a value of one in the x-bit bit mask sent to the first network device by the second network device.

6. The method of Claim 1 wherein the second portion of the bit mask is an (x-n) bit random number generated on the second network device, wherein n is less than or equal to x.

7. The method of Claim 1 wherein the x-bit bit mask template is a 64-bit, bit mask template.

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8. The method of Claim 1 wherein the step of generating a complete x-bit digital cookie on the first network device includes generating a complete x-bit digital cookie on the first network device by placing values of bits from the first portion of the x-bit digital cookie in bit positions with a value of one using the x-bit bit mask template, and by placing values of bits from the second portion of the x-bit digital cookie in bit positions with a value of zero using the x-bit bit mask template.

9. The method of Claim 1 wherein the second network device is any of a Distributed Network Address Translation gateway or a Realm Specific Internet Protocol gateway.

10. In a computer network with a plurality of network devices, a method for distributed generation of unique random numbers for digital cookies, comprising the steps of:

maintaining a list of complete digital cookies in use on the computer network on a second network device;

generating a x-bit bit mask template on a second network device, wherein the x-bit bit mask has n-bits randomly set to a value of one and remaining (x-n) bits randomly set to value of zero wherein n is less than or equal to x;

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sending the x-bit bit mask template to a first network device on the computer network;

receiving a request from the first network device to request a second portion of a x-bit digital cookie from the second network device, wherein the first message includes an first portion of the x-bit digital cookie;

(a) generating a second portion of a x-bit digital cookie on the second network device;

(b) generating a potential x-bit digital cookie on the second network device using the first portion of the x-bit digital cookie generated on the first network device and the second portion of the x-bit digital cookie generated on the second network device;

(c) comparing the potential x-bit digital cookie with complete digital cookies from the list of complete digital cookies maintained on the second network device that are in use on the computer network;

repeating steps (a), (b) and (c) until a potential x-bit digital cookie is generated that is not in use on the computer network; and

sending the second portion of the x-bit digital cookie for the potential x-bit digital cookie that is not in use on the computer network to the first network device, wherein the first network device uses the first portion of the x-bit digital cookie and the second portion of the x-bit digital cookie to create a complete x-bit digital cookie that is not in use on the computer network.

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11. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of Claim 10.

12. The method of Claim 10 wherein the first portion of the x-bit digital cookie includes an n-bit random number, wherein the n-bits were determined by counting a number of bits set to the value of one in the x-bit bit mask sent to the first network device and generating an n-bit random number on the first network device.

13. The method of Claim 10 wherein step (a) includes generating a (x-n) bit random number on the second network device, wherein the first portion of the x-bit digital cookie from the first network device includes n-bits.

14. The method of Claim 10 wherein step (b) includes placing values of bits from a n-bit first portion of the x-bit digital cookie generated on the first network device in bit positions with a value of one in the x-bit bit mask, and placing values of bits from a (x-n) bit second portion of the x-bit digital cookie generating on the second network device in bit positions with a value of zero in the x-bit bit mask.

15. The method of Claim 10 wherein the x-bit bit mask template is a 64-bit, bit mask template.

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16. The method of Claim 10 wherein the second network device is any of a Distributed Network Address Translation gateway or a Realm Specific Internet Protocol gateway.

17. In a computer network with a plurality of network devices, a method for distributed generation of unique random numbers for digital cookies, comprising the steps of:

sending a first request from a first network device to a second network device for an x-bit bit mask template;

receiving a first response on the first network device from the second network device including a x-bit bit mask template, wherein the x-bit bit mask template has n-bits randomly set to a value of one and remaining (x-n) bits randomly set to a value of zero, wherein n is less than or equal to x;

counting n-number of ones in the x-bit bit mask template on the first network device;

generating an n-bit random number on the first network device based on the n-number of ones counted in the x-bit bit mask;

sending a second request to the second network device including the n-bit random number for a (x-n) bit random number

receiving a second response from the second network device including a (x-n) bit random number; and

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creating a complete digital cookie using the (x-n) bit random number, the x-bit random number and the x-bit bit mask, wherein the complete digital cookie is not in use on the computer network.

18. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of Claim 17.

19. The method of Claim 17 wherein the x-bit bit mask template is a 64-bit bit mask template.

20. The method of Claim 17 wherein the second network device is any of a Distributed Network Address Translation gateway or a Realm Specific Internet Protocol gateway.

21. The method of Claim 17 further comprising:

sending the complete x-bit digital cookie in a plurality of messages used to a establish a secure connection between the first network device on the computer network and third network device on a remote computer network.

22. The method of Claim 21 wherein the plurality of messages include a plurality of Internet Key Exchange protocol messages.

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23. In a computer network with a plurality of network devices, a method for distributed generation of unique random numbers for digital cookies, comprising the steps of:

maintaining a list of complete digital cookies in use on the computer network on a second network device;

generating a x-bit bit mask template on a second network device, wherein the x-bit bit mask has n-bits randomly set to a value of one and remaining (x-n) bits randomly set to value of zero, wherein n is less than or equal to x;

sending the x-bit bit mask template to a first network device on the computer network;

receiving a request from the first network device to request an (x-n) bit random number for an x-bit digital cookie from the second network device, wherein the first message includes an n-bit random number;

(a) generating a (x-n) bit random number on the second network device;

(b) generating a potential x-bit digital cookie on the second network device using the n-bit random number generated on the first network device and the (x-n) bit random generated on the second network device, wherein the potential x-bit digital cookie is generated by placing values of bits from the n-bit random number generated on the first network device in bit positions with a value of one in the x-bit bit mask, and placing values of bits from a (x-n) bit random number generating on the second network device in bit positions with a value of zero in the x-bit bit mask;

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(c) comparing the potential x-bit digital cookie with complete digital cookies from the list of complete digital cookies maintained on the first network device that are in use on the computer network;

repeating steps (a), (b) and (c) until a potential x-bit digital cookie is generated that is not in use on the computer network;

sending the (x-n) bit random number used to generate the potential x-bit digital cookie that is not in use on the computer network to the first network device, wherein the first network device uses the n-bit random number and the (x-n) bit random number to create a complete x-bit digital cookie that is not in use on the computer network.

24. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of Claim 23.

25. The method of Claim 23 wherein the x-bit bit mask template is a 64-bit, bit mask template.

26. The method of Claim 23 wherein the second network device is any of a Distributed Network Address Translation gateway or a Realm Specific Internet Protocol gateway.

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27. The method of Claim 23 further comprising generating a complete x-bit digital cookie on the first network device using the n-bit random number, the (x-n) bit random number and the x-bit bit mask template.

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